

CLAIMS:

1. A method to provide color temperature correction in emission spectra of a
5 phosphor converted LED under PWM current drive comprising:

determining a modulation for a driving current signal 810;

modulating a constant magnitude current signal based on the determined
modulation 820; and

10 applying the modulated current signal to cause a color temperature
correction in the emission spectra 830 of the LED.

2. The method of claim 1 wherein determining a modulation 810 includes
determining a first LED 520 emission spectra color coordinate set and a second LED 520
emission spectra color coordinate set wherein the first color coordinate set represents
15 LED 520 emission spectra at a first LED 520 operational temperature and the second
color coordinate set represents a CCT shift in the LED 520 emission spectra due to
operation of the LED 520 at a second operational temperature.

3. The method of claim 2 wherein the current signal modulation is
20 determined 810 such that applying the determined current signal modulation 830 to the
LED 520 causes the LED 520 emission spectra at the first color coordinate set to be
substantially constant as the LED 520 operational temperature changes from the first
LED 520 operational temperature to the second LED 520 operational temperature.

25 4. The method of claim 1 wherein the modulation includes changing the current
signal frequency.

5. The method of claim 1 wherein the modulation includes changing the
current signal duty-cycle.

6. The method of claim 5 wherein the total light output of the LED 520 is changed responsive to the changing of the current signal duty cycle.

5 7. The method of claim 5 wherein the current signal frequency is changed to maintain a constant total light output of the LED 520.

10 8. The method of claim 1 wherein applying the modulated current signal 830 includes selectively coupling a power supply 650 to a phosphor converted LED 520 based on the determined modulation.

9. The method of claim 8 wherein the LED 520 is a phosphor converted white light LED.

15 10. The method of claim 9 wherein the LED 520 junction emission intensity is substantially constant while the phosphor emission intensity is increased responsive to the current signal modulation.

20 11. An apparatus to provide color temperature correction in an emission spectra of a phosphor converted LED 520 comprising:

a color correction control circuit 600; and

a phosphor converted LED 520 coupled to the control circuit 600

25 wherein the control circuit is configured to determine a modulation 810 for an LED 520 driving current signal modulate a constant magnitude current signal based on the determined modulation 820 and apply the modulated current signal 830 to the LED 520 to cause a color temperature correction in the emission spectra of the LED 520.

12. The apparatus of claim 11 wherein the control circuit 600 includes a constant- current magnitude pulse width modulator circuit 660 having configurable frequency and duty cycle.

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13. The apparatus of claim 12 wherein the control circuit 600 includes a power supply 650 selectively arranged to deliver power to the pulse width modulator circuit 660.

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14. The apparatus of claim 11 wherein the control circuit 600 includes a processor control system 670.

15. The apparatus of claim 14 wherein the processor control system 670 is enabled to control the steps of:

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determining a modulation for an LED 520 driving current signal 810; modulating a constant magnitude current signal based on the determined modulation 820; and

applying the modulated current signal 830 to the LED 520 to cause a color temperature correction in the emission spectra of the LED 520.

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16. The apparatus of claim 15 wherein determining a modulation 810 includes determining a first LED 520 emission spectra color coordinate set and a second LED 520 emission spectra color coordinate set wherein the first color coordinate set represents LED 520 emission spectra at a first LED 520 operational temperature and the second color coordinate set represents a CCT shift in the LED 520 emission spectra due to operation of the LED 520 at a second operational temperature and wherein a current signal modulation is determined 810 such that applying the determined current signal modulation 830 to the LED 520 causes the LED 520 emission spectra at the first color coordinate set to be substantially constant as the LED 520 operational temperature changes from the first LED 520 operational temperature to the second LED 520 operational temperature.

17. The apparatus of claim 11 wherein the LED 520 is a white light phosphor converted LED.

5 18. The apparatus of claim 15 wherein the LED 520 is an InGaN phosphor converted white-light LED 520.

19. A system to provide color temperature correction in an emission spectra of a constant current PWM driven phosphor converted white-light LED 520 comprising:

10 means for determining a driving current modulation to cause a color correction to the emission spectra 810;

means for modulating a current signal with the determined modulation 820;

15 means for applying the modulated current signal to cause a color temperature correction in the emission spectra 830 of the LED.